

(12) UK Patent Application (19) GB (11) 2 261 723 (13) A

(43) Date of A publication 26.05.1993

(21) Application No 9124662.9

(22) Date of filing 19.11.1991

(71) Applicant  
Bitech Engineering

(Incorporated in Ireland)

Barn Road, Dunleer, County Louth, Ireland

(72) Inventor  
Ronald Michael Warren

(74) Agent and/or Address for Service  
Carpmaels & Ransford  
43 Bloomsbury Square, London, WC1A 2RA,  
United Kingdom

(51) INT CL<sup>5</sup>  
F24H 3/00

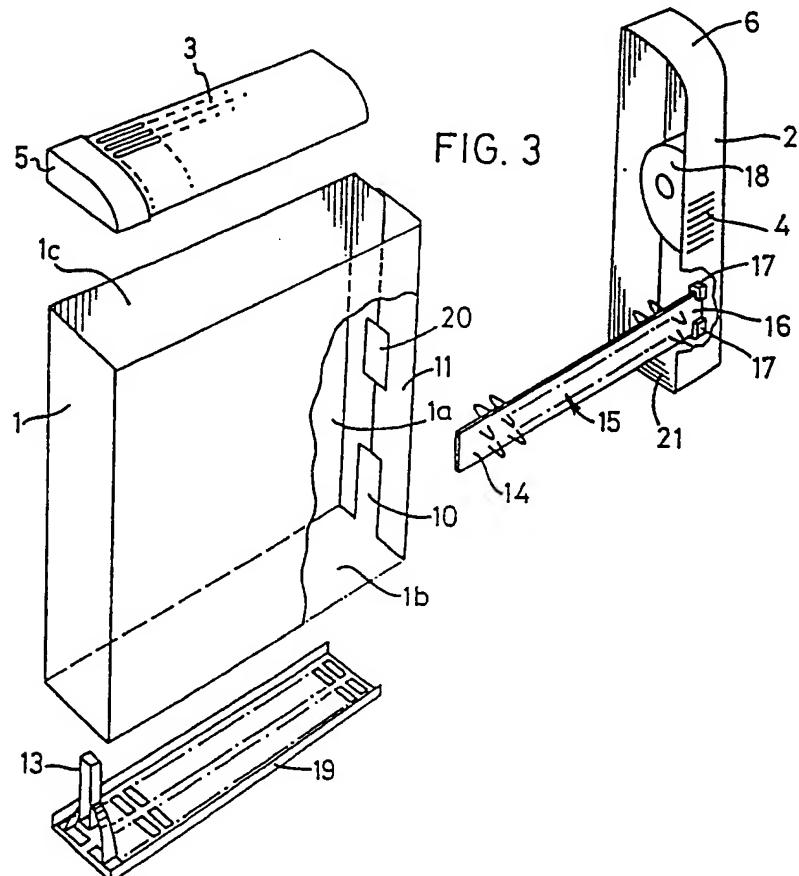
(52) UK CL (Edition L)  
F4S S60A S60E3

(56) Documents cited  
EP 0237428 A

(58) Field of search  
UK CL (Edition K) F4S  
INT CL<sup>6</sup> F24H

(54) Electrical convector heater

(57) An electrical convector heater comprising a casing (1) adapted to receive a heating element (15) supported by a side portion (6) when fitted to the body portion (1). Perforate closure members (3, 19) act as an air outlet and air inlet for the air convector chamber within body portion (1). The body portion (1) is selected from a range having different lengths for accommodating suitably dimensioned heating elements (15), so that similar side portions (6) can be fitted to body portions (1) of different lengths to vary the side or rating of the convector heater. The controls are all mounted in the side portion (6).



The references to Figure(s) 5 of the drawings in the printed specification are to be treated as omitted under Section 15(2) or (3) of the Patents Act 1977.

At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

GB 2 261 723 A

1/2

FIG. 1

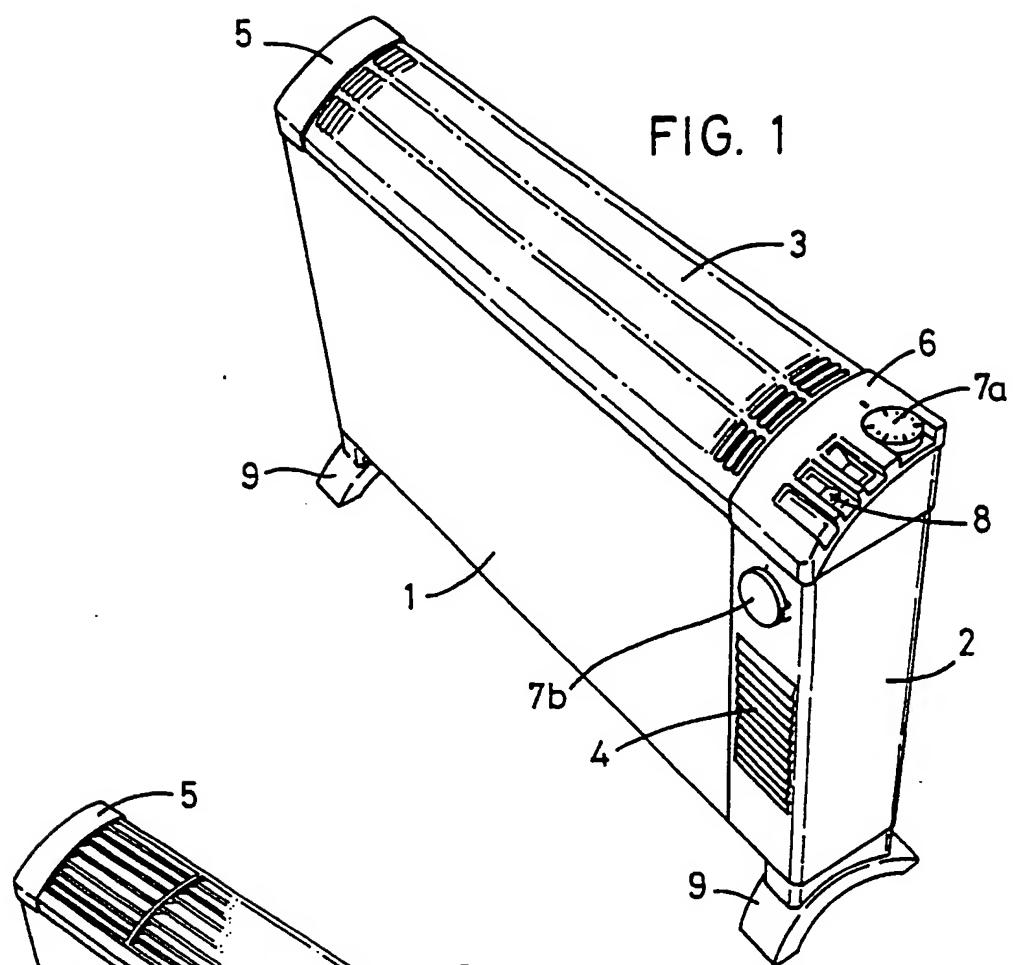
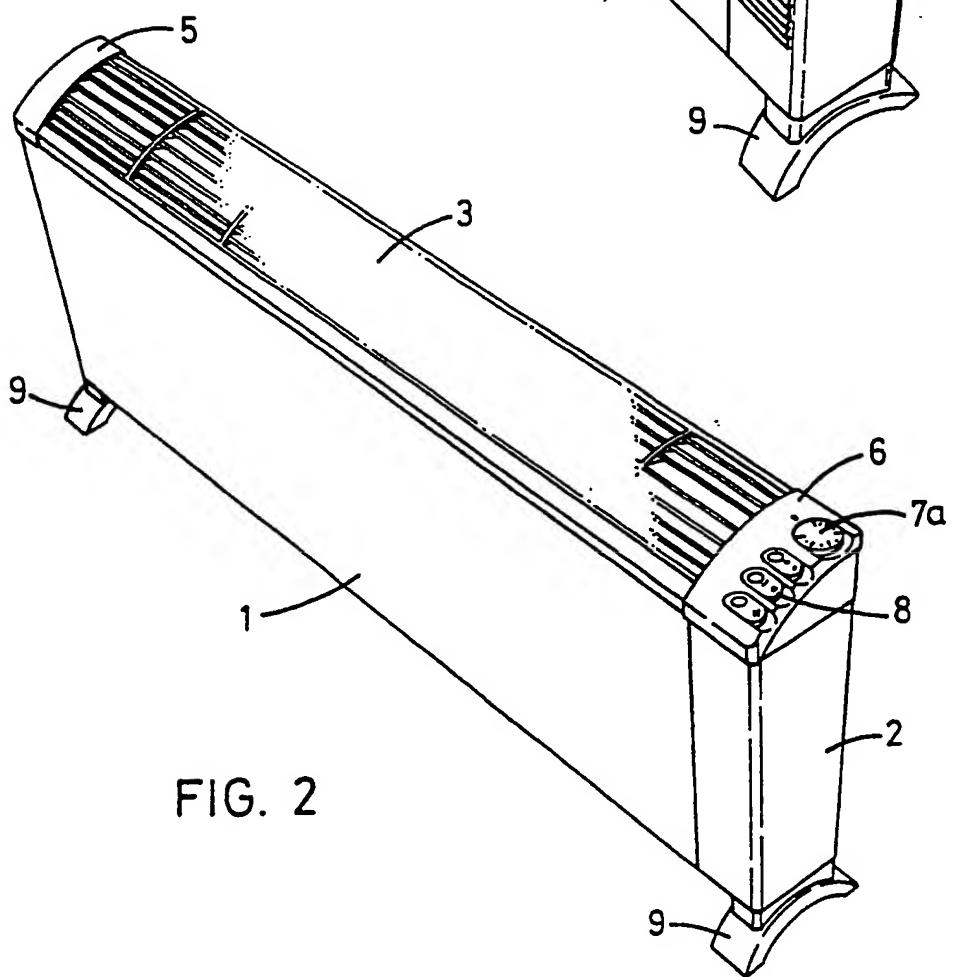


FIG. 2



2/2

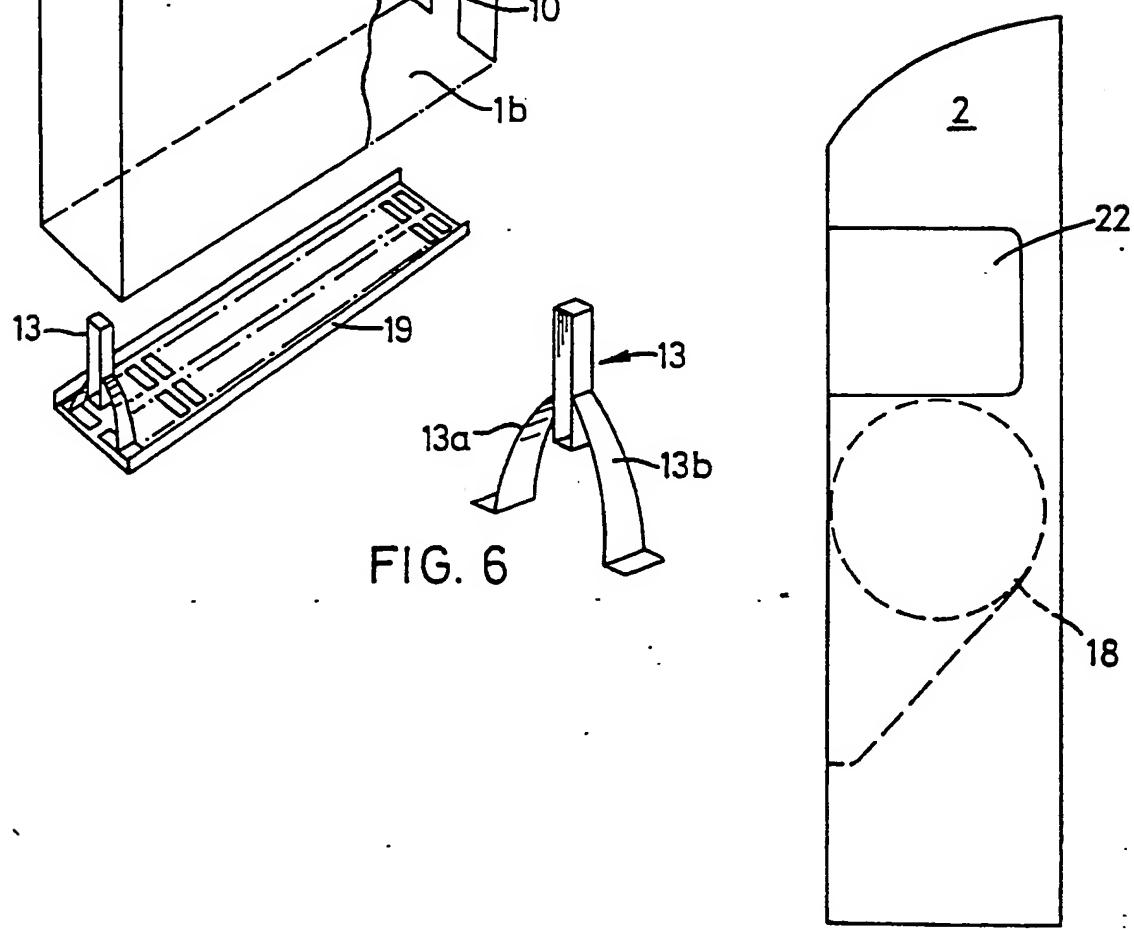
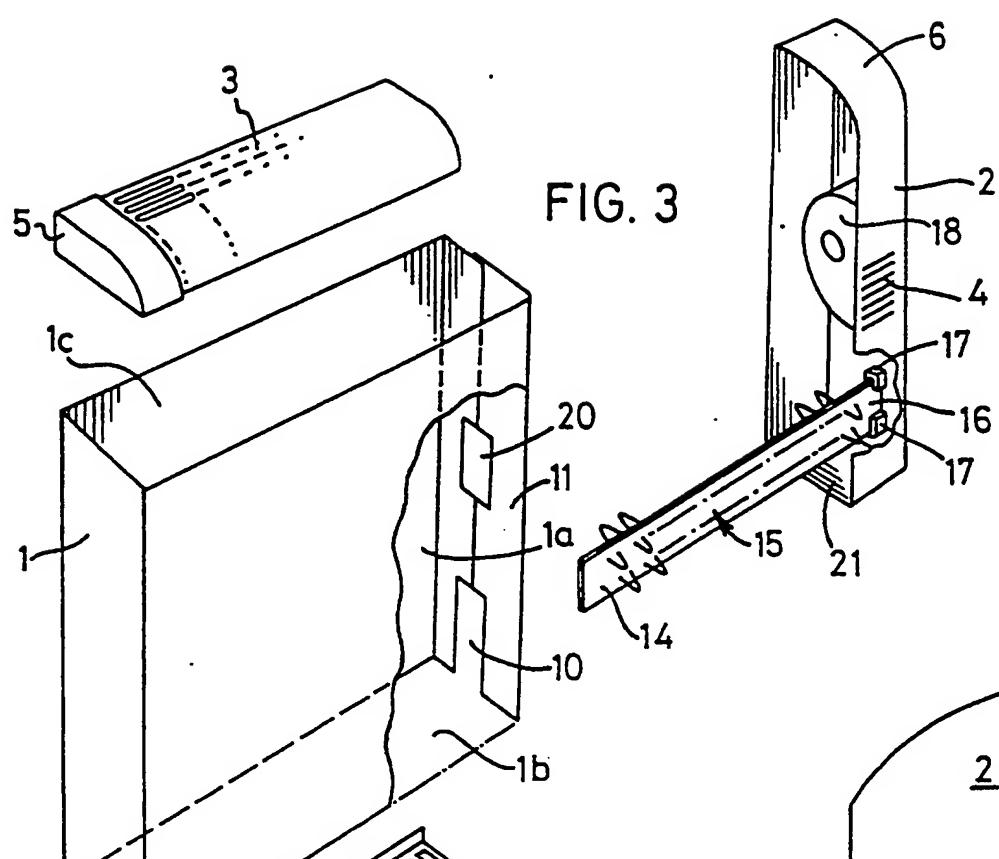


FIG. 6

ELECTRICAL CONVECTOR HEATER

This invention relates to an electrical convector heater.

5

Various designs of electrical convector heaters have evolved with the passage of time but these designs generally include a casing in which one or more electrical heating elements are mounted together with the necessary electrical 10 components for making electrical connections with, for supporting and for controlling the elements. The casing has an air inlet and outlet and may further include an electrical fan to increase the throughput of air, i.e. to provide forced convection, instead of natural convection.

15

It is a time-consuming operation to assemble the various parts of conventional convector heaters and variations in design, e.g. either to change the appearance, or the nominal rating, or both, usually involves re-tooling and changes in 20 the assembly procedure.

The present invention seeks to facilitate the manufacture and assembly of an electrical convector heater, especially to reduce assembly time where the size and/or 25 design of the heater needs to be changed to suit customer requirements.

In accordance with the invention, an electrical convector heater comprises:

30

a body portion which is designed to receive at least one electrical heating element but which contains no other electrical components, the body portion defining a convection chamber for air heated by said element, which 35 chamber has an air inlet and an air outlet, and

a side portion on which said heating element is mounted which side portion is fitted to one end of the body portion,

said side portion containing electrical components for connecting and for controlling an external supply of electricity to said element,

5 a perforate closure member fitted to an upper part of the body portion;

the body portion being selected from a range of body portions having different lengths for accommodating suitably 10 dimensioned heating elements whereby similar ones of said side portions can be fitted to body portions of different lengths to vary the size or rating of the electrical convector heater.

15 One advantage of this arrangement is that all of the electrical components required for connection and control can be mounted in the side portion thereby enabling the body portion to be of a simple construction (e.g. a pressed casing). The side portion can be made separately so that 20 it is common to body portions having different lengths. Thus, a similar connection and control sub-assembly can be used in heaters of different sizes, ratings, or designs whereby various designs of heater can be supplied more readily to suit customer requirements.

25

Preferably, the electrical heating element (or elements) is of a type where the electrical connections are made at one end only. These connections and the main means for mounting the element are all suitably provided in the side 30 portion. The main element mounting means is preferably an integral bracket on the side portion. When initially mounted in this way the element extends, in cantilever fashion, from the side portion into the interior of the body portion. However, the remote end of the heating element 35 may be supported by a mounting or bracket on a perforate closure member fitted to a lower part of the body portion.

According to one embodiment of the invention, an

electrical fan is also mounted in the side portion and the side portion includes an outlet for air heated by the element and expelled by the fan.

5        The invention enables the body portion to be made as a pressed-metal casing, whereby its shape and design can be readily varied (as long as it fits the side portion). The casing may be open at its lower end and (optionally) a perforate member fitted thereto, to define the convection air inlet, and a perforate closure member may be fitted to an upper part of the body portion, to define the convection air outlet. The side portion is preferably a plastics injection moulding in which the above-mentioned main element mounting or bracket is integrally formed. Additional 10 mountings or brackets for the other electrical components may also be integrally formed in the side portion, since this reduces or substantially eliminates the need for separate brackets or mountings. This assists in reducing manufacturing and assembly costs. Where a fan is fitted 15 for forced convection, the side portion may optionally include an integrally moulded part which forms the, or part of the housing or volute chamber for the fan. This can also reduces manufacturing and assembly costs.

25        In the preferred embodiment of the invention, the side portion includes an upper closure member on which controls are mounted, this member also preferably being made as an injection moulding. The upper closure member may be integral, or a separate part of the side portion.

30        The body portion may be provided with means for making a snap fit with the side portion but securing screws, for example, can also be used for safety.

35        The body portion and the side portion may also be of such a construction that injection moulded feet are snap-fitted thereto, the feet being provided to raise the body portion above floor level.

An embodiment of the invention will now be described with reference to the accompanying schematic Drawings in which:

5 Figs 1 and 2 are perspective views of electrical convector heaters in accordance with an embodiment of the invention,

10 Fig. 3 is an exploded view, in perspective and partly cut away showing component parts of the embodiment of the invention,

15 Fig. 4 is a simplified side elevation of a side portion of the heater showing an integral and internal fan moulding,

Fig. 5 is a perspective view of an electrical heating element, and

20 Fig. 6 is a perspective view of a bracket for supporting a remote end of the element.

Figs. 1 and 2 each show an electrical convector heater having a body portion 1, which is a sheet metal pressing, joined to a side portion 2, which is of an injection moulded plastics construction. The body portion 1 and side portion 25 2 each have a generally rectangular cross-section, in a vertical plane. The side portion 2 has a generally C-shaped cross-section in a horizontal plane whereby one end of the body portion 1 is received in the side portion 2. A perforate closure member or grille 3 extends across the open top of body portion 2 and acts as an outlet for heated air escaping from the heater by natural convection.

30 Another perforate closure member or grille 19 (Fig. 3) is fitted to the open bottom of the body portion 1 so as to act as an inlet for air which is drawn in either natural convection, or by an electrical fan which expels heated air through grille 4 by forced convection. One end of the grille 3 is received in an end closure member 5 and its

other end is received in an end closure member 6 in which a thermostatic control knob 7a and switches 8 are mounted. A timer control knob 7b is mounted on a front face of side portion 2 and it controls a timer (within portion 2) for 5 turing the heater on and off at preselected times. The grille 3, which fits over marginal edges of the body portion 1 and under the end closures 5 and 6 is of pressed metal construction. The end closures are of injection moulded plastics construction. As shown in Fig. 3, end closure 10 member 6 can be integrally formed as part of the side portion 2. Injection moulded plastics feet 9 are a snap fit into the body portion 1 and side portion 2.

The difference between Figs. 1 and 2 is that a forced 15 air outlet 4 is shown in Fig. 1 (which is missing from Fig. 2, since the heater of Fig. 2 operates by natural convection) and that the body portion in the heater of Fig. 2 is longer than that in Fig. 1, so as to receive a longer heating element (not shown), and thereby provide an 20 increased heat output.

Referring to the simplified drawing of Fig. 3, it can be seen that the body portion 1 contains no electrical components and is simply a metal pressing with a cut-outs 10 25 and 20 in the side panel 11. The panel 11 has inwardly directed edges which are secured together, e.g. by pop rivets or spot welding. The body portion 1 may be left open at the bottom but preferably has fitted thereto a perforate bottom closure member 19 as a convection air 30 inlet. Member 10 preferably is provided with a moulded bracket 13 which supports the furthest end 14 of the heating element 15 when the side portion 2 is fitted to the body portion 1. The body portion 1 thereby only receives the heating element 14, which passes through the cut out 10 and 35 is slotted into the bracket 13. Fig. 6 shows an enlarged view of bracket 13 which has a rectangular portion of folded construction to receive end 14 of element 15. It also has legs 13a, 13b with feet for attachment to grille 19.

In Fig. 3, the end closure member 6 is formed as an integral part of side portion 2. Member 5 and grille 3 are similar to those shown in Figs. 1 and 2.

5 The heating element 15 is mounted, at its other end 16, in brackets 17 which are preferably integral with (but could be secured to) the side portion 2. Thus, in the process of assembly, the heating elements 15 is initially cantilevered from the side portion 2 but its furthest 14 is supported by 10 bracket 13 when the heater is assembled. Fig. 5 is an enlarged view of heating element 15. The element has a double row of hairpin element portions 15a extending from each side, the element portions being supported by an insulating board 15b. Each row of element portions 15a is 15 connected, in series, to respective terminals 15c, 15d and to a common terminal 15e mounted on the board 15b. All electrical connections to element 15 are thus made in side portion 2.

20 Fig. 4 shows the outside end panel of side portion 2 and indicates (by broken lines) the position of a major part of an integrally mounted fan housing or volute chamber communicating with the grille 4. The integral housing 18 receives an electric motor (not shown) with an impeller (not 25 shown) mounted on its shaft. The fan (when fitted) draws air inwardly from the body portion 1, e.g. through a suitably positioned cut-out 20 in panel 11.

30 All of the electric components for making connection to and controlling the heating element 15 and the fan 18 (when fitted), including all knobs and switches, are mounted on the side portion 2 and end closure member or portion 6. Hence, the side portion with all of its electrical components can be pre-assembled, together with all cable 35 clamps and terminal blocks etc. before the side portion is fitted to the body portion 1. Preferably, the mountings and brackets (not shown) for these components are integrally formed in the side portion to reduce costs and assembly

time.

The body portion 1 is one of a range having different lengths and/or external finishes, the heating element 15 5 being of an appropriate length to provide the required heat output. Heaters with different ratings and/or external finishes may therefore be quickly assembled to suit customer requirements. If a fan is to be fitted, then the side portion 2 has the integral moulding 18 and outlet grille 4.

10

To facilitate assembly, the body portion 1 may be provided with spring-loaded tabs (not shown) to engage with corresponding recesses or slots (not shown) in side portion 2, or vice versa.

15

The feet 9 may be similarly snap-fitted to the base of the body portion 1 at one end and to the base of the side portion 2.

20

The design and length of the grille 3 can be varied to suit the required dimensions and customer requirements.

Similar switches 8 may be used with different heaters but their external appearance can be varied by using 25 different dollies. The number of switches may be varied (e.g. according to whether a fan is fitted, or not) and the missing switch may be replaced by a blanked-off portion on the moulding. The bank of switches, their associated thermostat knob, and the timer control knob can be located 30 in a recess (22) in the side portion and behind a hinged transparent cover to comply with standards for "drip-proof" construction. However, various other arrangements are possible.

35

## CLAIMS:

## 1. An electrical convector heater comprising:

5 a body portion which is designed to receive at least one electrical heating element but which contains no other electrical components, the body portion defining a convection chamber for air heated by said element, which chamber has an air inlet and an air outlet, and

10

a side portion on which said heating element is mounted which side portion is fitted to one end of the body portion, said side portion containing electrical components for connecting and for controlling an external supply of 15 electricity to said element,

a perforate closure member fitted to an upper part of the body portion;

20 the body portion being selected from a range of body portions having different lengths for accommodating suitably dimensioned heating elements whereby similar ones of said side portions can be fitted to body portions of different lengths to vary the size or rating of the electrical 25 convector heater.

2. A heater according to Claim 1 wherein said element is of a type having electrical connections at one end only, said side portion including means for mounting and making 30 electrical connection to said one end of the element.

3. A heater according to Claim 2 wherein the side portion includes an integral means for mounting said one end of the heating element.

35

4. A heater according to any of the preceding Claims wherein an electrical fan is mounted in the side portion and the side portion includes an outlet for air heated by the

element and expelled by the fan.

5. A heater according to Claim 4 wherein the body portion is a metal pressing and the side portion is a plastics 5 moulding in which there is provided an integral housing for the fan.

6. A heater according to Claim 5 wherein at least the convection air outlet is a perforate member fitted to an 10 upper part of the body portion, another perforate member being preferably fitted to a lower part of the body portion to provide the convection air inlet.

7. A heater according to any of the preceding Claims 15 wherein the body portion includes means for providing a snap fit with the side portion when fitted thereto.

8. A heater according to any of the preceding Claims wherein the side portion includes an upper closure member. 20

9. A heater according to any of the preceding Claims wherein brackets and mountings for said electrical components are integrally formed in the side portion.

25 10. A heater according to any of the preceding Claims wherein the body portion and the side portion each have a rectangular section, in a vertical plane, the side portion having a generally C-shaped cross-section in a horizontal plane for receiving one end of the body portion.

30 11. An electrical convector heater substantially as herein described with reference to the accompanying Drawings.

**Section 17 (The Search Report)**

9124662.9

<b>Relevant Technical fields</b>	<b>Search Examiner</b>
(i) UK CI (Edition K ) F45	
(ii) Int CI (Edition 5 ) F24H	J GRAHAM
<b>Databases (see over)</b>	<b>Date of Search</b>
(i) UK Patent Office	
(ii)	13 FEBRAURY 1992

**Documents considered relevant following a search in respect of claims**

1-11

<b>Category (see over)</b>	<b>Identity of document and relevant passages</b>	<b>Relevant to claim(s)</b>
X	EP 0237428 (AIRELEC) see case 5, element 1, and encasing 2	1-3,5

SF2(p)



sf - c:\wp51\doc99\fil001771

BEST AVAILABLE COPY

Category	Identity of document and relevant passages	Relevant to claim(s)

### Categories of documents

X: Document indicating lack of novelty or of inventive step.

Y: Document indicating lack of inventive step if combined with one or more other documents of the same category.

A: Document indicating technological background and/or state of the art.

P: Document published on or after the declared priority date but before the filing date of the present application.

E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.

&: Member of the same patent family, corresponding document.

**Databases:** The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).

**BEST AVAILABLE COPY**